

TCT-735

New Onset Atrio-Ventricular Block After Corevalve Implantation is Due to Direct Damage On the His-Bundle System

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Background: Third-degree atrio-ventricular block (AVB) is a frequent complication following transcatheter aortic valve implantation (TAVI) with the Corevalve prosthesis. Previous observational studies relate AVB to a lower implantation of the prosthesis into the left ventricle outflow tract (LVOT), indirectly suggesting that AVB may be the result of direct mechanical damage to the conduction system. Our aim is to analyze whether the final position of the Corevalve prosthesis in relation to the His bundle is indeed related to new onset AVB.

Methods: In 24 permanent-pacemaker-free patients (P) undergoing TAVI, a tetrapolar catheter was used to identify the intracavitary electrograms of the His bundle and as a marker of the His bundle position. Two independent readers analyzed the relative position of the inferior border of the Corevalve prosthesis (IBCV) and the tip of the His-bundle catheter (THBC) (above or below) at the end of the procedure in three fluoroscopy projections. Baseline electrocardiographic (EKG) conduction anomalies (AV and bundle branch blocks) and 3rd-degree AVB development during TAVI were also recorded for each P. This is a partial analysis of a more extensive study involving EPS stimulation immediately before and after Corevalve implantation. All P signed informed. PAWS 18 was used for statistical analysis.

Results: Two P were excluded from the analysis because the relative position of the IBCVP and the THBC suffered continuous variations along the cardiac cycle. The IBCVP was identified below the level of the THBC in 6P (group A) and above this level in the remaining 16 (group B). 3rd-degree AVB developed in 27% P following TAVI (in 67% P in group A and in 12.5% P in group B, $p=0.025$). No baseline EKG anomaly was related to 3rd-degree AVB development, probably due to the small sample size.

Conclusion: 3rd-degree AVB after Corevalve TAVI is related to prosthesis extension below the His bundle level. This study supports that the higher incidence of AVB reported in those P with a lower implantation of the prosthesis in the LVOT is due to direct damage to the His bundle system.

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Impact of CT-Guided Bioprosthesis Sizing on Post Procedural Aortic Regurgitation in Transcatheter Aortic Valve Implantation

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Background: Measurement of the aortic annulus is crucial for appropriate valve sizing in transcatheter aortic valve implantation (TAVI). The purpose of this study was to clarify the impact of CT-guided valve sizing on outcomes after TAVI.

Methods: TAVI was performed in 337 consecutive cases in our institution. Transesophageal echo (TEE)-guided valve sizing was conducted in our early experience ($n=228$). CT-guided approach has been applied since 2010 ($n=109$). The CT-measured mean annulus diameter was calculated as: $mDiam-CT = 2\sqrt{(\text{annulus surface}/\pi)}$. The outcomes of both strategies were compared.

Results: The CT group had lower Euroscore ($20.6 \pm 10.8\%$ vs $24.8 \pm 11.5\%$, $p=0.002$), higher eGFR (58.6 ± 22.6 vs 49.8 ± 24.2 ml/min, $p=0.002$) and left ventricular ejection fraction (58.6 ± 22.6 vs 49.8 ± 24.2 , $p=0.002$). TEE-measured annulus diameter (Diam-TEE) was similar (22.1 ± 2.0 vs 21.8 ± 1.8 mm, $p=0.155$). In the CT group, the Diam-TEE was larger than the shortest CT diameter (22.1 ± 2.0 vs 21.7 ± 2.0 mm, $p=0.008$), but smaller than mDiam-CT (23.4 ± 2.0 mm, $p<0.001$) and largest CT diameter (25.9 ± 2.3 mm, $p<0.0001$). The Edwards valve was used in 290 cases (23mm in 42%, 26mm 56% and 29mm 2%) and Corevalve in 47 (26mm in 26% and 29mm in 74%). Edwards valves were used similarly in both groups (84% vs 87%, $p=0.547$). The CT group had significantly larger valve size (25.8 ± 2.1 vs 25.0 ± 1.9 mm, $p<0.001$) and larger valve/Diam-TEE ratio (1.17 ± 0.08 vs 1.14 ± 0.10 mm, $p=0.014$) compared to TEE group. Although post dilatation was required similarly in both groups (12.7 vs 10.8%, $p=0.506$), the incidence of post-procedural AR ≥ 2 was decreased in CT group (19.1 vs 30.7%, $p=0.031$) without any increase in annulus rupture (0.9 vs 1.3%, $p=0.750$) and conversion to surgery was less often required in CT group (0% vs 3.5%, $p=0.004$).

Conclusion: CT-guided strategy provides larger valve sizing compared to TEE with appropriate accuracy, resulting in a significantly lower incidence of post-procedural AR without any increase in annulus rupture.

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Does the STS-PROM Score or the Logistic EuroSCORE Predict Outcomes Following Transcatheter Aortic Valve Replacement at 30 Days: the Milan Experience

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Background: No data has been published previously comparing the outcomes of transcatheter aortic valve replacement (TAVR) by commonly used surgical risk stratification scores.

Methods: All consecutive patients from our single-center prospective registry treated by TAVR transfemorally for aortic stenosis from November 2007 to April 2011, utilizing both commercially available valves were analyzed. Patients were categorized into low-, intermediate- and high-risk categories according to STS-PROM Score (STS) (<3, 3-8, >8) or Logistic EuroSCORE (LogES) (<10%, 10-20%, >20%). Study endpoints were defined by the Valve Academic Research Consortium (VARC) definitions.

Results: 249 patients were included: mean age 79.7 ± 7.5 years and 63.5% Edwards SAPIENTM. According to STS, there were 18.5% patients in the low-, 54.2% in the intermediate- and 27.3% in the high-risk category. According to LogES, there were 22.1% patients in the low-, 31.3% in the intermediate- and 46.6% in the high-risk category. Thirty-day mortality was 4.1% overall with no differences according to risk stratification: according to STS 6.8% in low- vs. 2.3% in intermediate- vs. 6.1% in high-risk ($p=0.271$). According to LogES 3.9% in low- vs. 1.3% in intermediate- vs. 6.1% in high-risk; $p=0.250$. Both high-risk groups developed more acute kidney injury stage 3: respectively in high risk STS 20.6% and in high risk LogES 13.8%. Moreover, there was a trend towards more life-threatening bleeding in the high-risk STS category (16.6% vs. 19.3% vs. 33.8%; $p=0.055$). There were no other differences in VARC safety and efficacy endpoints or combined safety endpoint at 30 days between groups.

Conclusion: Neither STS or LogES are predictors of 30-day mortality in patients undergoing TAVR. New scores need to be developed to help risk stratify these patients.

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Geometry of the Edwards SAPIEN XT valve as assessed by Multidetector Computed Tomography

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Background: The SAPIEN XT aortic bioprosthesis is the balloon expandable valve of choice for transcatheter aortic valve replacement (TAVR) due to its lower profile delivery system. This has been made possible, in part, by design and material changes to the frame. Clinical evaluation of the effect of these design modifications on radial expansion and circularity is lacking. We assessed the geometry of the SAPIEN XT bioprosthesis with multidetector computed tomography (MDCT) and correlated these findings with early clinical events.

Methods: MDCT was performed in 49 patients within one week of SAPIEN XT valve implantation. Geometry of the stent frame was assessed for circularity, minimum (Dmin) and maximum (Dmax) external diameter and expansion ratio at three stent levels: inflow, mid and outflow. Circularity was defined as an eccentricity index (EI) of less than 0.1 ($EI = 1 - Dmin/Dmax$) and expansion ratio (ER) as the MDCT derived stent area divided by the area of a fully expanded valve. Valve/annular malapposition on MDCT and grade of paravalvular aortic regurgitation (PR) on TEE were assessed.

Results: Stents were circular in 95.9% of cases (47/49). The mean expansion ratio was $105.1 \pm 7.2\%$ with no valves having an ER of less than 90%. The mean external diameter for the 20, 23, 26 and 29mm valves was 20.0 ± 1.0 mm, 23.5 ± 1.1 mm, 25.9 ± 0.7 mm and 29.0 ± 1.0 mm respectively. There was no difference in circularity or expansion ratio from the inflow to outflow aspect of the stents ($EI: 0.02$ vs. 0.02 , $p=0.75$, $ER: 104.8\%$ vs. 106.5% , $p=0.26$). There was no difference in expansion or circularity in patients with moderate to severe valvular PR compared to trace/mild PR ($ER: 108.4\%$ vs. 105.3% , $p=0.37$, $EI: 0.05$ vs. 0.02 , $p=0.40$). Annular malapposition (12/43, 27.9%) on MDCT was associated with moderate to severe valvular PR in 21.4% (3/14) compared with 5.7% (2/35) with circumferential annular apposition ($p=0.12$).

Conclusion: The early structural integrity of the SAPIEN XT valve is excellent as demonstrated by full expansion and circularity across all stent levels. Malapposition on MDCT may be associated with paravalvular aortic regurgitation.